

### ABSTRACT OF THE DISCLOSURE

An acoustic modeling system and an acoustic modeling method use beam tracing techniques that accelerate computation of significant acoustic reverberation paths in a distributed virtual environment. The acoustic modeling system and method perform a priority-driven beam tracing to construct a beam tree data  
5 structure representing "early" reverberation paths between avatar locations by performing a best-first traversal of a cell adjacency graph that represents the virtual environment. To further accelerate reverberation path computations, the acoustic modeling system and method according to one embodiment perform a bi-directional beam tracing algorithm that combines sets of beams traced from pairs of  
10 avatar locations to efficiently find viable acoustic reverberation paths.

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